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23,919/61.

COMMONWEALTH OF AUSTRALIA

PATENT SPECIFICATION

		Class	Int. Cl.
Application Number Lodged	23,919/61. 2nd November, 1962. Accompanied by Provisional Specification.	87.4.	A61b.

Complete Specification
Entitled A LUNG BIOPSY NEEDLE.

Lodged 4th November, 1963.
Accepted Lapsed before Acceptance.
Published 6th May, 1965.

Convention Priority -

Applicant IAN RONALD JACK.

Actual Inventor IAN RONALD JACK.

Related Art: 21,441/62. 87.4.

The following statement is a full description of this invention, including the best method of performing it known to me :

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87-2D-20/10/66-5P.C.

The invention provides a means of obtaining a small particle of lung tissue, known medically as a lung biopsy specimen from the body of a living human being. This specimen is obtained without having to subject a patient to chest surgery. A specimen so obtained, can be examined microscopically as an aid to diagnosing lung diseases.

It is thought by the inventor that this needle is the first to have been designed specifically for lung biopsies. The invention features design characteristics quite different from any needle or device known or employed previously to obtain a lung biopsy specimen or for that matter a biopsy specimen of any organic tissue.

The clinical application of this needle to date has suggested that the invention provides more consistently reliable results in respect to obtaining biopsy specimens and affords a simplified technique in operation.

DESCRIPTION of NEEDLE

The needle is essentially a punch type mechanism. The needle consists of an outer needle tube 8 cms in length and 2.4 mms in diameter externally. Within the bore of this tube is allowed to slide a close fitting rod. The end of this rod is welded to a triangular pointed tip assembly. Insertion of the rod with the tip attached within the tube changes the needle from a hollow tube to a solid pointed rod. Movement of the rod relative to the outer tube distends the tip of this apparent solid needle.

Referring to the attached drawing sheet number one (1):-

Figure 1 is a view of the outer needle tube (b^2)

attached to needle handle (C). (a) is a short hollow extension tube which is tapered internally a short distance to correspond with the taper on (b^1). (a) will be referred to as a cutting cannula. (d) and (e) are respectively an adjusting nut and a locking nut threaded internally. The internal diameter at (C^1) allows the locking nut (d) to slide within it the length of the section of diameter (d^1).

Figure (2) is a view of the inner rod J^1 which slides within the tube bore B^2. J^2 is threaded to correspond with the internal thread in nuts (d) and (e). (f) is a triangular or trocar pointed tip. (g) is a six tooth radial snag. The body of bearing area h is bored for a short distance to house the rod f^1. Rod f^1 is welded to the tip assembly at h. The diameter of (h) and (g) is identical and slightly greater than that of the rod (f^1). The internal bore of the cutting cannula (a) corresponds to these diameters. Diameter (f) is greater than the outer diameter of the cutting annula (a) and prevents the tip (f) from being drawn within the cannula (a).

Figure 3 is a view of the assembled needle in the closed position.

Figure 4 is a view of the needle in the open position. The tip has been projected away from the cutting cannula by pushing the lock nut assembly into the bore of the handle (C_1). The amount of projection is controlled by the adjustment of nuts (j) & (k) relative to the thread on the rod (f^2).

Figure 5 is a view of a trocar pointed punch used to make an initial puncture in the skin of a patient prior to application of the needle.

Referring to sheet 2

Figure 6 is a view of the cutting cannula showing at A^1 a slight external taper. The cutting edge at A^1 is a concave lapped surface. A^2 illustrates the slight internal taper corresponding to the taper on the end of the needle tube b^1

Figure 7 is a view of the tip assembly components (f) (g) and (h) welded onto rod (f^1).

Figure 8 is a sectional view of the tip assembly and the cutting cannula assembled in the closed position. Lung tissue snared and engaged on the six tooth radial snare is allowed to become entrapped in the relieved area g^1 when the cutting cannula is approximated with the recessed anvil surface (f^1). The severing of the lung speciment from the parent lung occurs at this point only.

The Method of Application

The introducing skin trocar (5) facilitates skin puncture and avoids the use of a scalped blade.

Prior to use the following adjustment is checked. The punch should open 5-6 mm in the open position. The domed lock nut (e) is tightened firmly against adjusting nut (d). This ensures that the inner rod and tip assembly can be held immobile while the outer cutting cannula (a) is rotated against the anvil f^1 in the closed position.

The closed needle is sharply advanced about 3-4 cms into the lung during held inspiration. The punch is then opened and the whole assembly withdrawn about 1.5 cms, to ensure trapping a portion of lung on the snare. The punch is sharply and firmly closed. While maintaining a firm pressure in this position the inner rod is held

immobile and the outer needle handle (c) is rotated through an arc of 90° in an oscillatory manner, to sever the tissue. The needle is then quickly withdrawn, holding it firmly in the closed position. The biopsy specimen is retrieved from the relieved tip area (g^1).

The claims defining the invention are as follows:-

1. I claim that the principle by which the tip (f) of this needle described in the specifications can actually be projected or separated a controlled distance from the cutting cannula edge (a) and needle body (b^2) and again retracted to a colosed position or close proximity is my original design. (2nd November, 1962)

2. I claims that the principle of projection or separating the needle tip from the cutting cannula (a) to expose a snaring mechanism and specimen retaining area is my original design. (2nd November, 1962)

3. I claims that the construction and principle of the multi tooth snag or other snaring mechanism positioned and applied as described in this specification is my original design. (2nd November, 1962)

4. I claim that the principle by which the closing of this needle effects a cutting action of tissue placed between the concave lapped cutting edge (a^1) of the cannula (a) and the anvil (f^1) of the tip (f) is my original design. (2nd November, 1962).

DATED this 31st day of OCTOBER, 1963.

I.R. JACK.

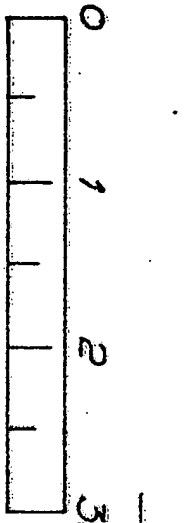

FIG. 5.

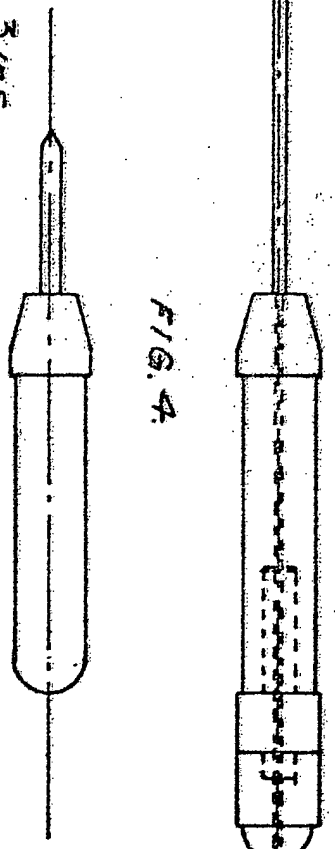

FIG. 4.

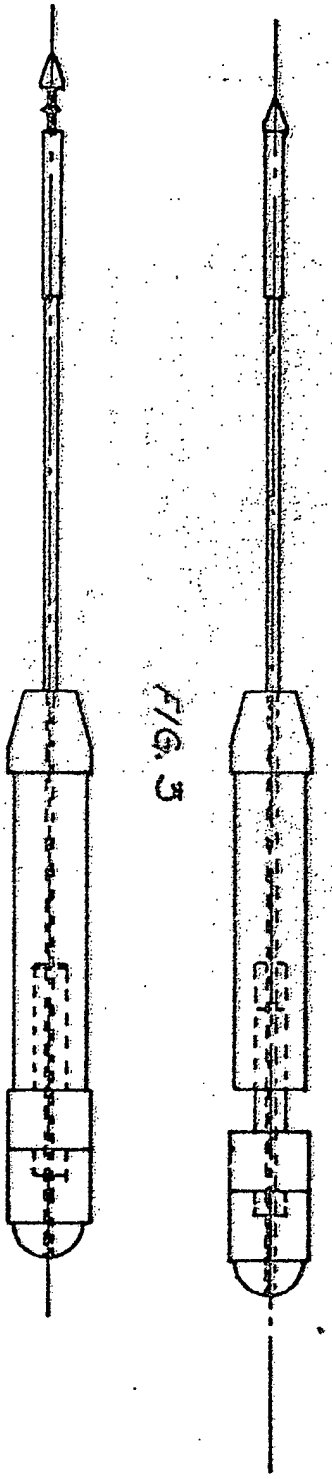

FIG. 3.

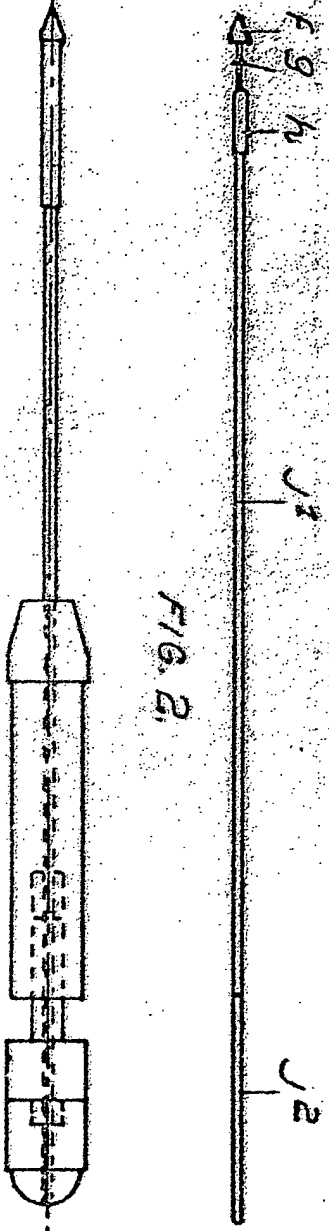

FIG. 2.

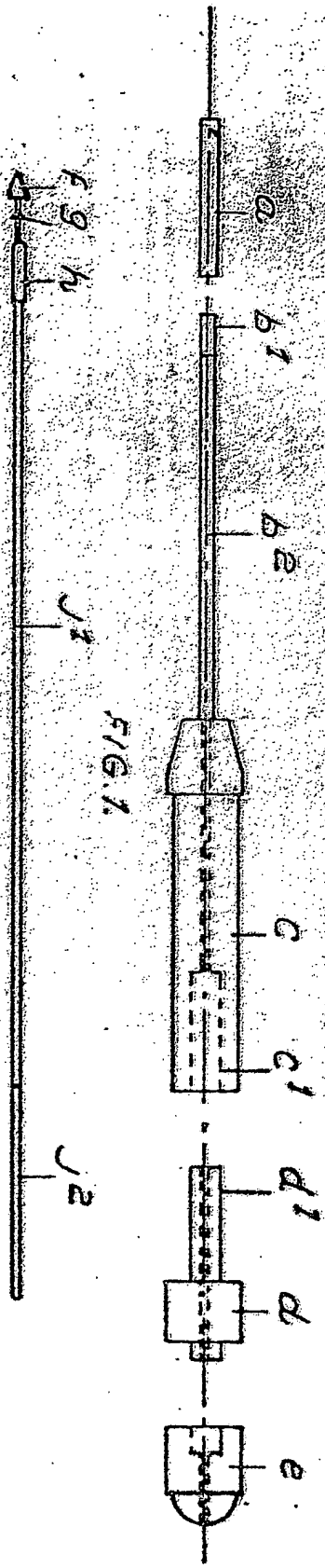

FIG. 1.

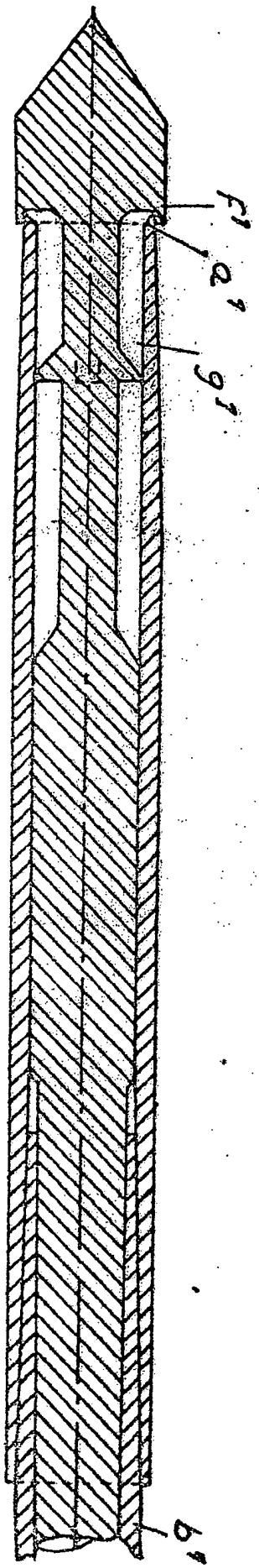

FIG. 8.

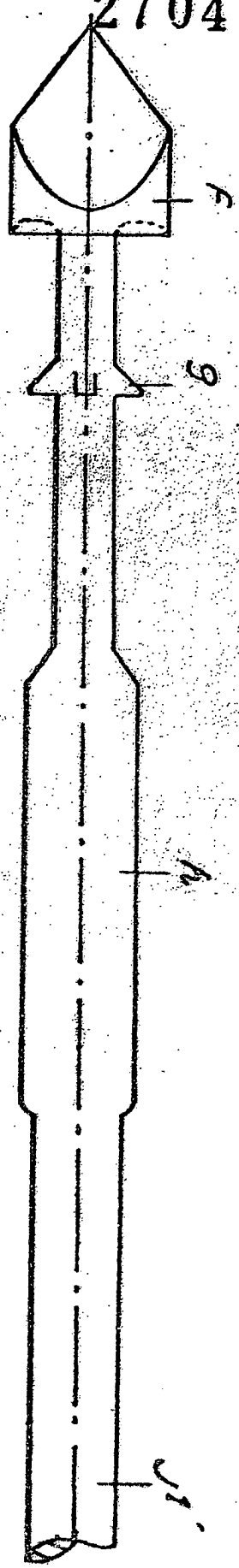

FIG. 7.

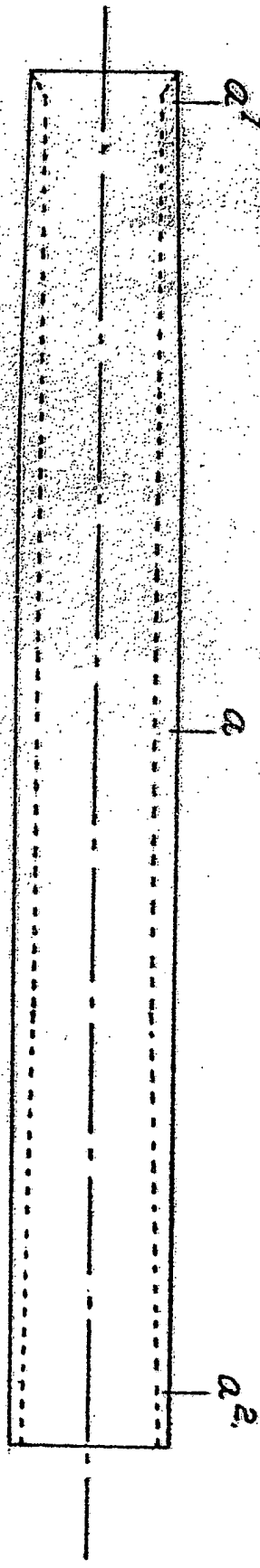

FIG. 6.